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10/554,359	10/25/2005	Seigo Muramatsu	Q91021	2995

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EXAMINER	
RALIS, STEPHEN J	

ART UNIT	PAPER NUMBER
3742	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/554,359	MURAMATSU ET AL.	
	Examiner	Art Unit	
	Stephen J. Ralis	3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 October 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendments/Arguments

Applicant's arguments filed March 12, 2007 have been fully considered but they are not persuasive as for the following reasons:

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1, 4, 7 and 14 rejected under 35 U.S.C. 103(a) as being unpatentable over Beetz et al. (U.S. Publication No. 2002/0011484) in view of Hada et al. (U.S. Publication No. 2002/0179443).

Beetz et al. disclose an air heater system (1) comprising: an electrothermal heating element (PTC heating elements); a frame made out of metal (page 2, paragraph 23); and the control device being fixed within the box-shaped lateral frame bar (5; page 2, paragraph 31).

With respect to the limitation of a semiconductor switch connected to the electrothermal heating element in series for controlling energization to the electrothermal heating element, Beetz et al disclose control board (10) including control electronics (12) to determine the amount of current which is to be delivered by power electronics components (11) to respective heating elements (2). The printed circuit board (10) of Beetz et al. inherently has a semiconductor switching means within the control electronics (12) and power electronics components (11) or the printed circuit board would not be able to determine and control the amount of power delivered to the device. Furthermore, Beetz et al. disclose connecting the PTC elements in series to the control device (page 2, paragraphs 31-33).

With respect to the limitation of semiconductor switch being mounted on a wiring board and the frame and wiring board being made of resin, Beetz et al. explicitly disclose the frame being made of plastic or metal (page 2, paragraph 23) and plastic is clearly and inherently a synthetic resin. Furthermore, Beetz et al. all disclose a printed circuit board (10) as noted above. It is further known in the art that circuit boards are traditionally sealed with thermoplastic resin. Therefore, Beetz et al. fully meets "a wiring board on which the semiconductor switch is mounted" and "the frame and the wiring board are made of resin" given its broadest reasonable interpretation.

Regarding the last line of claims 7 and 14 (describing how the frame and wiring board are made i.e. molding), the limitation merely recites a product by process limitation. It is well settled that reciting how a product is made does not further limit the structure of the product itself. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted.).

Beetz et al. disclose all of the limitations of the claimed invention, as previously set forth, except for the semiconductor switch having a current detecting function provided with a terminal for current detection to detect a current which flows in the electrothermal heating element; and the air heater system further comprising a resistance value control means for controlling a resistance value of the electrothermal heating element to adjust the temperature of the electrothermal heating element in multiple stages based on output corresponding to the current which flows in the electrothermal heating element detected through the current detection terminal of the semiconductor switch in order to bring the temperature of the intake air to an appropriate temperature for an operating condition of the internal combustion engine.

However, a semiconductor switch having a current detecting function with a terminal to detect current flowing in the electrothermal heating element, as described by

Hada et al., is known in the art. Hada et al. teach a heater control circuit (26) comprising a heater (39)/connection harness combination, a semiconductor switch (transistor 26a turns on/off based on microcomputer signal 20; page 85, paragraph 85; see Figures 3,4,6) having a current detecting function provided with a terminal (connection to microprocessor 20 to transistor 26a; see Figure 3) to detect current flowing in the electrothermal heating element (Ihe; page 5, paragraph 65; see Figure 3). In addition, Hada et al. teach a resistance value controls means (heater control circuit 26) for controlling the power supply to the heater (39)/connection harness combination. Controlling the power across a resistive heater (39) of Hada et al. inherently controls the resistance value or heating output of the heater (39) including the power connection harness. Hada et al. also teach a duty cycle correction means using current (page 7, paragraphs 98-99). Hada et al. explicitly teach a case alternative to the heater resistance, R, being constant and instead with the heater voltage V being constant (page 7, paragraph 99). Hada et al. further teach that in controlling the power to the heater (39), the current flowing through heater (39) is usually constant, however, the use of such duty cycle control serves to compensate for a *variation in resistance* of the harness leading to the heater (39) which, in essence, is part of the heater (39) (page 1, paragraph 5; page 7, paragraph 100; page 7-8, paragraph 105).

With respect to the limitation of multiple stages, Hada et al. explicitly teach a control loop in Figure 4 that includes the step (140) to control power supply to the heater which would occur at all stages of vehicle operation.

Therefore, the controlling of the power supplied to the heater (39)/connection harness combination to compensate for variation in resistance of the harness/heater (39) combination fully meets "comprising a resistance value control means for controlling a resistance value of the electrothermal heating element to adjust the temperature of the electrothermal heating element in multiple stages based on output corresponding to the current which flows in the electrothermal heating element detected through the current detection terminal of the semiconductor switch" given its broadest reasonable interpretation.

Hada et al. further teach providing such control has the advantage of improving the controllability of a power supply to the heater and also minimize the error in determining the resistance of the heater (Abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Beetz et al. with the semiconductor switch and current detecting of Hada et al. to improve the controllability of a power supply to the heater and also minimize the error in determining the resistance of the heater.

With respect to the limitations of "for heating intake air in an intake path of an internal combustion engine", it has been held that the recitation that an element is "for" performing a function is not a positive limitation but only requires the ability to so perform. Furthermore, it has been held that a recitation with respect to the manner is which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Therefore, since Beetz et al. is utilized to heat the air flowing into a heater block

(Abstract), the combination of Beetz et al. and Hada et al. heat an intake air flow into a device, Beetz et al. in view of Hada et al. structure is fully capable of "heating intake air in an intake path of an internal combustion engine" given its broadest reasonable interpretation.

5. Claims 5, 6, 12, 13, 19 and 20 rejected under 35 U.S.C. 103(a) as being unpatentable over Beetz et al. (U.S. Publication No. 2002/0011484) in view of Hada et al. (U.S. Publication No. 2002/0179443) as applied to claims 1, 4, 7 and 14 above, and further in view of Hidetaka et al. (Japanese Publication No. JP 07078671 A) as evidenced by Bohlender et al. (U.S. Patent No. 5,057,672).

The Beetz-Hada air heater system combination discloses all of the limitations including a frame being made of plastic or metal, as described in claims 1, 4, 7 and 14 above, except for specifically calling for a part of the frame being resin.

However, a part of a heater frame being resin, as described by Hidetaka et al., is known in the art. Hidetaka et al. teach a heat radiating part comprising of part of the frame-shaped case (3) made of a heat resistant resin being fixed in a frame shaped housing (4) made of metal to suppress conduction of the heat from the radiation part to the housing, thereby effectively heating the air through the heating element (English translation of Abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify frame of the Beetz-Hada air heater system combination with the part resin, part metal frame of Hidetaka et al. to suppress

conduction of the heat from the radiation part to the housing, thereby effectively heating the air through the heating element.

With respect to the limitations of claims 5, 6,12, 13, 19 and 20 and the electrothermal heating element having such a temperature converging property that a temperature rises and then converges to a predetermined convergence temperature when the electrothermal heating element is continuously supplied with maximum allowable voltage, Beetz et al. explicitly disclose a PTC heating element being the electrothermal heating element. It is known in the art, as described by Bohlender et al. in column 2, lines 3-14, that PTC heating elements are characterized by low electric resistance in the cold state, this resistance increasing with rising temperature, so that the current flow through the PTC heating element is reduced as its temperature rises. It is also known that PTC heating elements have self regulating properties thereby preventing overheating of the PTC heating elements. Furthermore, the temperature capable of being attained by a PTC heating element can be determined by the selection of certain parameters during its manufacture. Therefore, the Beetz-Hada-Hidetaka air heater system combination inherently has a temperature converging property that a temperature rises and then converges to a predetermined convergence temperature when the electrothermal heating element is continuously supplied with maximum allowable voltage, due to the heating element being a PTC heater as evidenced by Bohlender et al.

In addition, with respect to the further limitations of claims 5, 12 and 19 and the resinous part being arranged in such a place that the resinous part has rigidity adequate

for actual use even when the electrothermal heating element is at the convergence temperature, Beetz et al. explicitly disclose the frame of the heater being made of plastic (page 2, paragraph 23). Furthermore, Hidetaka et al. explicitly teach the resinous material of the frame case (3) being heat resistant (English translation of Abstract). Therefore, if both Beetz et al. and Hidetaka et al. teach utilizing a resin material for the frame of a PTC element heater, the resinous part would inherently have a rigidity adequate for actual use even when the electrothermal heating element is at the convergence temperature inherent to a PTC heating element or the heaters would not function as intended.

Furthermore, with respect to the further limitations of claims 6, 13 and 20 and the frame including a resinous part made of resin having a predetermined deflection temperature under load, and the resinous part is arranged in such a place that the temperature of the resinous part remains below the deflection temperature under load even when the electrothermal heating element is at the convergence temperature, the Examiner respectfully reiterates that Beetz et al. explicitly disclose the frame of the heater being made of plastic (page 2, paragraph 23) and Hidetaka et al. explicitly teach the resinous material of the frame case (3) being heat resistant (English translation of Abstract). The Examiner, as well as Applicant within the specification, notes that any resinous part made of resin inherently has a predetermined deflection. Therefore, if both Beetz et al. and Hidetaka et al. teach utilizing a resin material for the frame of a PTC element heater, the resinous parts made of resin would inherently have a predetermined deflection temperature under load. Furthermore, the resinous parts of

Beetz et al. (entire frame) and Hidetaka et al. (inner region adjacent PTC heater elements) would be inherently arranged such that the temperature of the resinous part remains below the deflection temperature under load even when the electrothermal heating element is at the convergence temperature inherent to a PTC heating element or the heaters would not function as intended.

6. Claims 3, 8-11 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beetz et al. (U.S. Publication No. 2002/0011484) in view of Hada et al. (U.S. Publication No. 2002/0179443) as applied to claims 1, 4, 7 and 14 above, and further in view of Sommer et al. (U.S. Patent No. 2001/0021093) and Burner (U.S. Patent No. 5,823,155).

The Beetz-Hada air heater system combination discloses all of the limitations, as described in claims 1, 4, 7 and 14 above, except for the semiconductor switch having an over-temperature protecting function for interrupting current passing through the semiconductor switch when a temperature thereof becomes a shut-off temperature; and the semiconductor switch including an over-temperature signal output terminal which outputs an over-temperature warning signal when the temperature of the semiconductor switch becomes a warning temperature.

However, temperature semiconductor circuit configurations having an over-temperature protecting function for interrupting current passing through the semiconductor switch when a temperature thereof becomes a shut-off temperature and further including an over-temperature signal output terminal which outputs an over-

temperature warning signal when the temperature of the semiconductor switch becomes a warning temperature, as described by Sommer et al., is known in the art. Sommer et al. teach a semiconductor switch having an over-temperature protecting function for interrupting current passing through the semiconductor switch when a temperature thereof becomes a shut-off temperature and (page 1, paragraph 8; page 2 paragraph 23 – page 3, paragraph 30; see Figures 1,2) and providing an output signal with respect to the over-temperature condition (ST1 and T2) to provide the ability to distinguish between an overload/short circuit and an over-temperature case, providing more information to outside of the switch, thereby increasing the operational efficiency of the semiconductor switch.

Furthermore, such a semiconductor switch controlling an auxiliary heating apparatus in vehicles, as described by Burner, is known in the art. Burner teaches a control circuit for an auxiliary heater comprising a semiconductor switch (power switching transistor PROFET P; page 5, lines 29-64) to provide an error diagnosis and self-protecting deactivation of the auxiliary heater (column 3, lines 34-37), thereby increasing the operational lifetime of the heater.

With respect to the limitations of claim 3 and detecting a failure of the electrothermal heating element by detecting a resistance value of the electrothermal heating element based on output corresponding to the current which flows in the electrothermal heating element detected through the current detection terminal of the semiconductor switch, Sommer et al. further teach a signal related to the voltage signal (AS; see Figure 2) relative to load of the device to which the semiconductor switch is

connected to provide the ability to determine a overload/short circuit providing more information to outside of the switch, thereby increasing the operational efficiency of the semiconductor switch.

With respect to the limitation of claim 10 and including an over-temperature protecting means for interrupting the current passing through the semiconductor switch in response to the over-temperature warning signal from the over-temperature signal outputting terminal of the semiconductor switch, Sommer et al. teach that the over-temperature signal can be detected from the outside (page 1, paragraph 8; page 3, paragraph 30) to provide more information to outside of the switch, thereby increasing the operational efficiency of the semiconductor switch.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the Beetz-Hada air heater system combination with the overload and over-temperature distinction and protection of Sommer et al. and teaching of the use of such a semiconductor switch in auxiliary heating components of a vehicle of Burner, to provide the ability to distinguish between an overload/short circuit and an over-temperature case, providing more information to outside of the switch, thereby increasing the operational efficiency of the semiconductor switch..

With respect to the limitation of claims 8 and 15 and the semiconductor switch being fixed to the frame in such a place that the temperature of the semiconductor switch becomes the shut-off temperature when the temperature of the electrothermal heating element reaches an excessive temperature, Beetz et al. explicitly disclose the control device of the heater fixed within the frame (prior art; page 1, paragraph 4;

invention; page 2, paragraph 25; see Figures 3,4). Therefore, the Beetz-Hada air heater system combination in view of Sommer et al. and Burner would inherently have the semiconductor switch attached to the frame and further inherently shut-off when the temperature of the electrothermal heating element reaches an excessive temperature.

Remarks

7. With respect to applicant's argument that Hada et al. does not teach a technique for controlling the resistance value of the heater, the examiner respectfully disagrees. Hada et al. teach a heater (39) having a harness connecting the power supply thereto. Hada et al. further teach a resistance value controls means (heater control circuit 26) for controlling the power supply to the heater (39)/connection harness combination. Controlling the power across a resistive heater (39)/connection harness combination of Hada et al. inherently controls the resistance value or heating output of the heater (39) that includes the power connection harness. Hada et al. also teach a duty cycle correction means using current (page 7, paragraphs 98-99). Hada et al. explicitly teach a case alternative to the heater resistance, R, being constant and instead with the heater voltage, V, being constant (page 7, paragraph 99). Hada et al. further teach that in controlling the power to the heater (39), the current flowing through heater (39) is usually constant, however, the use of such duty cycle control serves to compensate for a *variation in resistance* of the harness leading to the heater (39) which, in essence, is part of the heater (39) (page 1, paragraph 5; page 7, paragraph 100; page 7-8, paragraph 105). Therefore, in light of the harness and heater (39) being considered a

single element and the controller compensating for a variation in the resistance of the harness and heater (39) combination, Hada et al. clearly teaches controlling the resistance value of heater/harness combination based on the corresponding current that flows through the heater/harness combination.

8. With respect to applicant's argument that Beetz et al. and Hada et al. do not teach a semiconductor switch mounted on a wiring board and the frame and wiring board being made of resin, the examiner respectfully disagrees. Beetz et al. explicitly disclose the frame being made of plastic or metal (page 2, paragraph 23) and plastic is clearly and inherently a synthetic resin. Furthermore, Beetz et al. all disclose a printed circuit board (10) as noted above. It is further known in the art that circuit boards are traditionally sealed with thermoplastic resin. Therefore, Beetz et al. fully meets "a wiring board on which the semiconductor switch is mounted" and "the frame and the wiring board are made of resin" given its broadest reasonable interpretation.

9. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., so as to provide the semiconductor switch and the wiring board with water-proof properties) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Ralis whose telephone number is 571-272-6227. The examiner can normally be reached on Monday - Friday, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu Hoang can be reached on 571-272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Stephen J Ralis
Examiner
Art Unit 3742

SJR
May 25, 2007

Tu Ba Hoang
Primary Examiner